

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A method for debugging ~~an a fabricated~~ electronic system having instrumentation circuitry included therein, wherein the electronic system is described with an HDL description, said method comprising:

- (a) as part of the electronic system's design process: generating the instrumentation circuitry at least by activating certain design visibility, design patching or design control aspects of the instrumentation circuitry available for examining or modifying the electronic system via the instrumentation circuitry;
- (b) determining configuration information based on the certain activated design visibility, design patching or design control aspects ~~that are activated~~;
- (c) after the electronic system has been fabricated with the instrumentation circuitry to form an integrated circuit product, configuring the instrumentation circuitry in accordance with the configuration information;
- (d) receiving debug data from the configured instrumentation circuitry operating within the integrated circuit product;
- (e) translating the debug data into HDL-related debug information; and
- (f) relating the HDL-related debug information to the HDL description.

2. (original) A method as recited in claim 1, wherein the HDL description is a high-level HDL description.

3. (original) A method as recited in claim 2, wherein the HDL-related debug information is described in a high-level HDL.

4. (currently amended) A method as recited in claim 1, wherein said translating (e) is performed automatically.

5. (original) A method as recited in claim 1, wherein said method operates without any requirement for a test bench.

6. (original) A method as recited in claim 1, wherein the debug data includes at least status information or sampling data.

7. (canceled)

8. (currently amended) A method as recited in claim 17, wherein said activating (a) is performed using a graphical user interface.

9. (currently amended) A method as recited in claim 1, wherein said method further comprises:

(g) displaying the high-level HDL description with the HDL-related debug information related thereto.

10. (currently amended) A method as recited in claim 1, wherein the design control aspects include trigger conditions, and wherein said activating (a) operates to enable a user to set one or more trigger conditions from the trigger conditions available by way of the instrumentation circuitry.

11. (original) A method as recited in claim 1, wherein the electronic system comprises an integrated circuit.

12. (original) A method as recited in claim 1, wherein the electronic system comprises a programmable integrated circuit.

13. (currently amended) A method as recited in claim 1, wherein the electronic system includes a hardware portion and a software portion, and wherein said method further comprises:

(g) interacting with a software debugger which debugs the software of the electronic system.

14. (currently amended) A method as recited in claim 1, wherein said method further comprises:

(g) interacting with a functional simulator which simulates a portion of the electronic system.

15. (original) A method as recited in claim 1, wherein the electronic system is operated in its target environment and running at its target speed during said debugging.

16. (currently amended) A method as recited in claim 15 14, wherein the target environment includes real- time characteristics.

17. (original) A method as recited in claim 1, wherein while debugging the electronic system, the electronic system is operating in its target environment without interruption for the purpose of debugging.

18. (original) A method as recited in claim 1, wherein said debugging operates to identify at least one fault of the electronic system.

19. (original) A method as recited in claim 18, wherein the at least one fault is selected from the group consisting of: specification error, design error, tool error, device driver error, timing error, manufacturing fault, and environment error,

20. (original) A method as recited in claim 1, wherein the instrumentation circuitry comprises design instrumentation circuitry.

21. (currently amended) A method for debugging an a fabricated integrated circuit product having instrumentation circuitry included therein, wherein the integrated circuit product was being designed with a high-level HDL description, said method comprising:

- (a) as part of the integrated circuit product's design process: generating the instrumentation circuitry at least by activating certain aspects of the instrumentation circuitry available for examining and/or modifying the integrated circuit product by the instrumentation circuitry;
- (b) determining configuration information based on the certain activated aspects that are activated;
- (c) after the integrated circuit product has been fabricated: configuring the instrumentation circuitry in accordance with the configuration information;
- (d) receiving debug data from the configured instrumentation circuitry operating within the integrated circuit product;
- (e) translating the debug data into HDL-related debug information;
- (f) relating the HDL-related debug information to the high-level HDL description; (g) and thereafter retrieving circuit status information for the integrated circuit product via the instrumentation circuitry;
- (h) displaying state information concerning the integrated circuit product based on the retrieved circuit status information.

22. (original) A method as recited in claim 21, wherein the HDL-related debug information is described in a high-level HDL.

23. (currently amended) A method as recited in claim 21, wherein said displaying (h) comprises:

relating the state information to the high-level HDL description; and displaying the high-level HDL description of the integrated circuit product with the state information related thereto.

24. (original) A method as recited in claim 21, wherein the state information includes signal values for signals, and

wherein said relating operates to relate the signal values to HDL identifiers within the high-level HDL description that correspond to the signals.

25. (new) An article of manufacture including program code which, when executed by a machine, causes the machine to perform method for debugging a fabricated electronic system having instrumentation circuitry included therein, wherein the electronic system is described with an HDL description, said method comprising:

as part of the electronic system's design process: generating the instrumentation circuitry at least by activating certain design visibility, design patching or design control aspects of the instrumentation circuitry;

determining configuration information based on the certain activated design visibility, design patching or design control aspects;

after the electronic system has been fabricated with the instrumentation circuitry to form an integrated circuit product, configuring the instrumentation circuitry in accordance with the configuration information;

receiving debug data from the configured instrumentation circuitry operating within the integrated circuit product;

translating the debug data into HDL-related debug information; and

relating the HDL-related debug information to the HDL description.

26. (new) A article of manufacture as recited in claim 25, wherein the HDL description is a high-level HDL description.

27. (new) A article of manufacture as recited in claim 26, wherein the HDL-related debug information is described in a high-level HDL.

28. (new) A article of manufacture as recited in claim 25, wherein said translating is performed automatically.

29. (new) A article of manufacture as recited in claim 25, wherein said method operates without any requirement for a test bench.

30. (new) A article of manufacture as recited in claim 25, wherein the debug data includes at least status information or sampling data.

31. (new) A article of manufacture as recited in claim 24, wherein said activating is performed using a graphical user interface.

32. (new) A article of manufacture as recited in claim 25, wherein said method further comprises:

displaying the high-level HDL description with the HDL-related debug information related thereto.

33. (new) A article of manufacture as recited in claim 25, wherein the design control aspects include trigger conditions, and wherein said activating operates to enable a user to set one or more trigger conditions from the trigger conditions available by the instrumentation circuitry.

34. (new) A article of manufacture as recited in claim 25, wherein the electronic system comprises an integrated circuit.

35. (new) A article of manufacture as recited in claim 25, wherein the electronic system comprises a programmable integrated circuit.

36. (new) A article of manufacture as recited in claim 25, wherein the electronic system includes a hardware portion and a software portion, and wherein said method further comprises:

interacting with a software debugger which debugs the software

of the electronic system.

37. (new) A article of manufacture as recited in claim 25, wherein said method further comprises:

interacting with a functional simulator which simulates a portion of the electronic system.

38. (new) A article of manufacture as recited in claim 25, wherein the electronic system is operated in its target environment and running at its target speed during said debugging.

39. (new) A article of manufacture as recited in claim 38, wherein the target environment includes real- time characteristics.

40. (new) A article of manufacture as recited in claim 25, wherein while debugging the electronic system, the electronic system is operating in its target environment without interruption for the purpose of debugging.

41. (new) A article of manufacture as recited in claim 25, wherein said debugging operates to identify at least one fault of the electronic system.

42. (new) A article of manufacture as recited in claim 41, wherein the at least one fault is selected from the group consisting of: specification error, design error, tool error, device driver error, timing error, manufacturing fault, and environment error,

43. (new) A article of manufacture as recited in claim 25, wherein the instrumentation circuitry comprises design instrumentation circuitry.

44. (new) An article of manufacture including program code which, when executed by a machine, causes the machine to perform a method for debugging a fabricated integrated circuit product having instrumentation circuitry included therein, the integrated circuit product being designed with a high-level HDL description, said method comprising:

as part of the integrated circuit product's design process: generating the instrumentation circuitry at least by activating certain aspects of the instrumentation circuitry for examining and/or modifying the integrated circuit product;

determining configuration information based on the certain activated aspects;

after the integrated circuit product has been fabricated: configuring the instrumentation circuitry in accordance with the configuration information;

receiving debug data from the configured instrumentation circuitry operating within the integrated circuit product;

translating the debug data into HDL-related debug information;

relating the HDL-related debug information to the high-level HDL

description and thereafter retrieving circuit status information for the integrated circuit product via the instrumentation circuitry;

displaying state information concerning the integrated circuit product based on the retrieved circuit status information.

45. (new) A article of manufacture as recited in claim 44, wherein the HDL-related debug information is described in a high-level HDL.

46. (new) A article of manufacture as recited in claim 44, wherein said displaying comprises:

relating the state information to the high-level HDL description; and displaying the high-level HDL description of the integrated circuit product with the state information related thereto.

47. (new) A article of manufacture as recited in claim 44, wherein the state information includes signal values for signals, and wherein said relating operates to relate the signal values to HDL identifiers within the high-level HDL description that correspond to the signals.